



PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Ball Joint having Lubricating Grooves in the Bearing Surface

I, VICTOR LANGEN, of German Nationality, personally responsible Partner of the firm A. Ehrenreich & Cie., of Hansa-Allee 190, Düsseldorf-Oberkassel, Germany, do hereby
5 declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to a ball joint which consists of a joint casing which may contain one or more bearing members, and a ball pivot having a part-spherical head mounted in the casing. One of the relatively sliding surfaces,
15 that is to say the bearing surfaces of the casing or bearing members and the ball head, is usually provided with lubricating grooves. The sliding surfaces are naturally subject to a certain wear, which is at its greatest in the main
20 loading zone i.e. the polar zone of the joints. For this reason the grooves do not wear uniformly, but first wear in the middle of the loading zone while they are always better preserved in the direction of the equator. Since
25 in many ball joints, particularly those for the independent suspension of steered motor vehicle wheels, the lubricant entry lies in the loading zone, the operation of the entire joint is jeopardized if wear on the grooves in this
30 region prevents the access of grease into the interior of the joint.

It is therefore the object of the invention to construct the grooves so that over practically the entire sliding surface, measured
35 in the direction of the main load, they are of approximately the same depth, that is to say measured radially they continually increase in depth from the equator to the pole. This is achieved by the fact that the bottoms of the
40 lubricating grooves lie on the periphery of a sphere, the radius of which corresponds to the radius of the ball head, and the centre of which is displaced axially relative to the centre of the head in the direction of the main load-

ing of the relatively sliding surface in which
the grooves are formed. 45

One embodiment of the invention is illustrated by way of example, in comparison with the known construction, in the accompanying
50 drawings, in which:

Figure 1 shows a joint of conventional construction with lubricating grooves, the depth
of which is the same in the radial direction,

Figure 2 shows a bearing bush in which the bottoms of the lubricating grooves are displaced
55 in the axial direction, and

Figure 3 shows a ball pivot with grooves in both halves of the divided ball head.

The casing is designated by 1, the ball pivot by 2, and the closure cap of the casing by 3.
60 The casing 1 contains a part-spherical bearing bush 4 which is secured against rotation by a toothed washer 5. The bearing bush has a central recess 6 and lubricating grooves 7.
65 The lubricating grooves 7 are of equal depth in the radial direction. When therefore they have already disappeared through wear in the polar zone, they still exist in the region of the equator. In order to ensure uniform wear,
70 that is to say to ensure that the grooves 7 disappear approximately simultaneously over the entire surface of the bush, according to Figure 2 the bush is manufactured so that
75 the bottoms of the lubricating grooves lie on a spherical periphery the radius of which corresponds to the radius of the ball head and the centre *m* of which is displaced axially in the loading direction in relation to the centre
80 *M* of the bearing surface. From the end face of the bush towards the polar region the depth of the lubricating grooves therefore increases continuously in the radial direction. In this way the ball will reach the bottom of the lubricating grooves, after the bush has worn,
85 at approximately the same time at practically all points.

The ball joint according to Figure 3 is designed to be loaded in two axial directions,

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which are opposite to one another. In addition, its ball head is divided, and consists of two spherical segments 2 and 2¹, each of which has a number of lubricating grooves 7 and 7¹ the bottoms of which grooves lie on the periphery of spheres whose radii correspond to the radii of the spherical segments and whose centres are displaced in the directions of loading which are opposite to one another. In this way the grooves are supposed to become worn approximately at the same time.

WHAT I CLAIM IS:—

1. A ball joint, consisting of a joint casing which may contain one or more bearing members and a ball pivot having a part-spherical head mounted in the casing, in which

at least one of the relatively sliding bearing surfaces of the casing or the bearing members and the ball head has lubricating grooves, characterised in that the bottoms of the lubricating grooves lie on the periphery of a sphere the radius of which corresponds to the radius of the ball head, and the centre of which is displaced axially relative to the centre of the head in the direction of the main loading of the relatively sliding surface in which the grooves are formed.

2. Ball joints substantially as described with reference to Figures 2 and 3 of the accompanying drawings.

MARKS & CLERK,
Chartered Patent Agents,
Agents for the Applicant.

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COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of
the Original on a reduced scale

Fig. 1

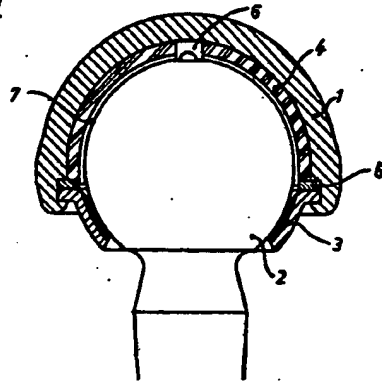


Fig. 2

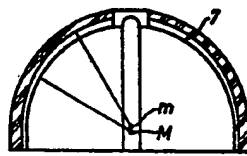


Fig. 3

